



Land Manager Objectives and Alternatives for Mixed-Pine Forest Ecosystem Management in Eastern Upper Michigan

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Abstract

The results reported here are a first step in a structured decisionmaking approach aimed at encouraging more informed mixed-pine forest ecosystem management choices. The goal was to identify management objectives and alternatives through open-ended interviews with 13 land managers in eastern Upper Michigan. The results indicate that where mixed-pine forest ecosystem management is concerned, ecological objectives (e.g., restoring ecosystem integrity) take precedence over socioeconomic objectives (e.g., providing forest products). The reverse is true for fire management, where socioeconomic objectives (e.g., protecting public safety) take precedence over ecological objectives. Despite interest in restoring fire, or using fire as one of many management tools to help emulate natural disturbances, managers felt limited by uncertainty about the potential risks to their management objectives. They also faced difficult trade-offs between achieving short- versus long-term objectives, as well as significant external barriers (e.g., institutional mandates). The next stage of this project is to identify measures that indicate how well a potential alternative performs across each objective of interest (e.g., To what degree does prescribed burning increase habitat quality? Prevent future catastrophic fire? Regenerate a particular species of interest?). Measures will be identified through consultation with experts in the field and a review of the existing literature. Ultimately the goal is to develop a decision-support tool that will assist managers in balancing competing objectives and making difficult trade-offs in this highly complex decision context.

Background

- Geographic variability exists in the way pine species regenerate and establish and in the way these forests develop (Drobyshev et al. 2008; Bergeron and Brisson 1990; Gilmore and Palik 2006).
- Managing for variability may require multiple tactics in order to tailor activities to site-specific conditions
- Such complexity in management can be problematic by introducing uncertainty and resulting in risk-averse decisions (Stankey et al. 2003; Christensen 2003; Maguire and Albright 2005)
- Structured decision making approaches can reduce complexity in the decision process and ensure that management action maximizes achievement of stated objectives (Arvai et al. 2006)

Structured Decision Making

- Tools designed to encourage the consideration of multiple objectives and facilitate tradeoffs when these objectives conflict (NRC 1996).
- 5 Steps:
 - Characterize the objectives that matter most to participants
 - Create a set of alternatives that address these objectives
 - Employ the best available information to characterize possible impacts of alternatives on stated objectives
 - Identify and address tradeoffs based on the values and objectives of participants
 - Summarize areas of agreement/disagreement to choose the best option of suite of options that meets objectives

Methodology

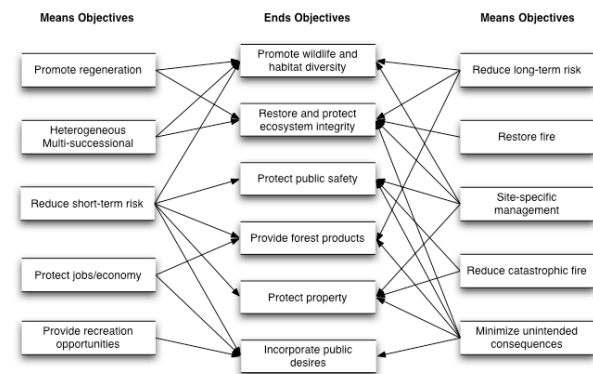
- **Participants**
 - 13 land managers
 - USFWS (5), USFS (3), TNC (3), MDNR (2)
- **Interviews**
 - 1-2 hours per participant
 - Open-ended questions covering the key topics listed in the results section

Results (only those mentioned by a majority, % of interviewees who mentioned each response included in parentheses)

- **Forest Management Objectives**
 - Promote wildlife diversity (77%), promote habitat diversity (69%), restore mixed-pine ecosystems (69%), & promote heterogeneous and multi-successional composition & structure (69%)
- **Perceived Risks of Fire in the Ecosystem**
 - The majority focused on risks posed to socioeconomic objectives - protecting human health/life (85%), timber products (77%), and property (77%)
- **Perceived Benefits of Fire in the Ecosystem**
 - The majority focused on benefits to both socioeconomic and ecological objectives - increased habitat/wildlife (77%), job creation/economic growth (69%), regeneration and maintenance of early successional species (62%), and increased opportunities for nonconsumptive recreation (bird watching, hiking, etc.) (54%)
- **Objectives for Managing Fire**
 - The majority focused on socioeconomic driven objectives - meeting public desires (69%), protecting property (69%), and reducing fuel loads in order to prevent catastrophic fire (62%)
 - Participants also mentioned several objectives specific to the practice of managing fire - to be site-specific (85%), reduce short-term risk (i.e., suppress fire) (77%), allow natural fire to play a role (62%), and reduce long-term risk (i.e., restore fire) (54%)
- **Available Management Actions and Risks and Benefits of Current Action**
 - The majority thought the following actions were necessary - prescribed burning (85%), suppression (62%), Wildland Fire Use (54%), mechanical thinning (54%), partial harvesting (54%), and planting/seeding (54%)
 - 60% were concerned about the unintended consequences created by current management action (e.g., loss of options and flexibility in the future)
 - There was little agreement over whether current action posed a risk or benefit to objectives of interest
 - E.g. - A lack of fire may increase forest products in the short-term (60%) or place valuable trees at-risk from increased catastrophic fire over the long-term (50%)
- **Desired Future Management Action and Key Barriers**
 - 62% stated that the most desired change in management was to incorporate more WFU and prescribed fire
 - The key barriers to making this change were mandates and statutes (77%), lack of ecosystem knowledge and uncertainty (77%), lack of resources (69%), public perceptions and needs (69%), and wildland-urban interface constraints (62%)

Simple Means-Ends Network

- We organized the findings into a means-end network, which separates fundamental or "ends" objectives from "means" objectives and highlights the causal influences between them.
 - The "ends" objectives, or those that matter most to land managers, are shown down the middle.
 - The "means" objectives, or those that are not fundamentally most important, but may be necessary to achieve an end objectives are shown down the sides
- The influence arrows identify the connection between a particular means objective and the final end objective
 - For example - the end objective of promoting wildlife and habitat diversity can be achieved through many different means that were highlighted by participants. these include promoting regeneration, maintaining heterogeneous and multi-successional composition and structure, reducing both short- and long-term risk, as well as managing in a site-specific manner.



Conclusions

- Managers want to promote biodiversity and restore ecosystem integrity while protecting public safety, forest products, property and public desires
- Making tradeoffs, where you give up performance on one objective (e.g., place a threatened species in danger) in order to increase performance on another objective (e.g., protect homes) among fundamental objectives or values, can be difficult if not impossible (Tetlock et al. 2000)
- Managers indicate additional difficulty with predicting the likelihood of particular outcomes (uncertainties) and dealing with short- versus long-term tradeoffs
- The development of better decision support tools that predict performance of management action across the various end objectives could assist managers in addressing uncertainties, balancing conflicting objectives, and making difficult tradeoffs

Next Steps - We Need You!

- If you are interested in participating in the next phase of work please sign-up below!
- We will be holding workshops to seek feedback on how best to measure performance and develop decision support tools that will inform mixed-pine management.
- We will also be developing a longer-term consortia of fire science providers and managers to enhance fire science delivery and adoption.



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Acknowledgments: Support provided by the Joint Fire Science Program (Project 05-2-1-86), the Ohio Agricultural Research and Development Center, The Ohio State University, and Seney National Wildlife Refuge. We would also like to acknowledge the individual managers who participated in this study.

